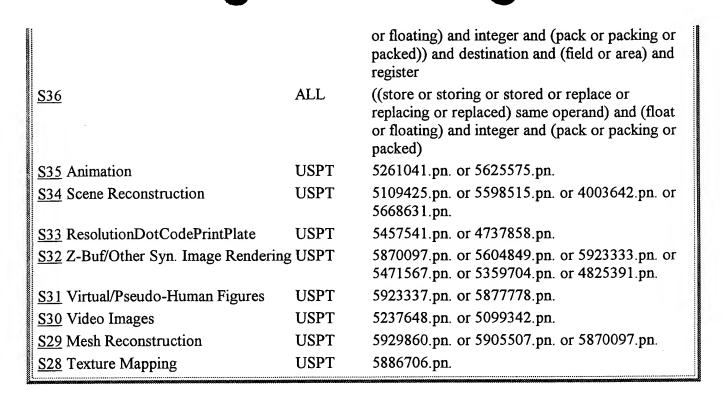
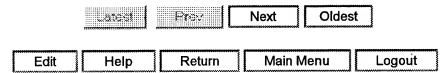


http://jupiter:88/bin/cgi-bin/ShowSa





```
PLEASE ENTER HOST PORT ID:
PLEASE ENTER HOST PORT ID:x
LOGINID: d2701ws
PASSWORD:
TERMINAL (ENTER 1, 2, 3, 4, OR ?): 3
             Welcome to MESSENGER (APS Text) at USPTO
      The USPTO production files are current through:
      September 07,1999 for U.S. Patent Text Data.
      September 07,1999 for U.S. Current Classification Data.
      September 07,1999 for U.S. Patent Image Data.
           PLEASE USE 305-9000 FOR NEW TELEPHONE NUMBER
  * More U.S. patent data is now available on APS. The new
  * USOCR file contains patents issued in 1970, plus some
   patents that were missing from the USPAT file. See the
  * Patents News Folder under the Public Folders in e-mail for
  * more information on using the new file. Thank you.
  DISCLAIMER:
    Neither the United States Government, nor any agency
    thereof, nor any of their contractors, subcontractors or
    employees make any warranty, expressed or implied,
    including any warranty of marketability of fitness for a
    particular purpose; nor assumes any legal liability or
    responsibility for any party's use, or the results of
    such, of the data.
                  Help Desk --> 703-305-9000
      The Help Desk is staffed for APS support 7 days/week.
        Monday through Friday: 6:30am - 9:00pm
        Saturday, Sunday, Holidays: 8:30am - 5:00 pm
      The Help Desk staff at this number will handle all APS
      related questions.
      * * * * * * * * *
      >>>>>> NEW SUNDAY HOURS !!! <<<<<<<
      The APS is available:
              6:30am - 9:00pm Monday through Friday
              7:30am - 5:00pm Saturday, Sunday, Holidays
        APS is unavailable Thanksgiving Day, Christmas Day,
        and New Year's Day.
```

FILE 'USPAT' ENTERED AT 11:03:53 ON 10 SEP 1999

Trying 01081...Open

```
U.S. PATENT TEXT FILE
   THE WEEKLY PATENT TEXT AND IMAGE DATA IS CURRENT
   THROUGH September 07, 1999.
=> file uspat epo jpo; s ((stor? or replace?) (p) operand? (p) (((high or
low) (w) order) or leftmost or rightmost)) and float? and integer? and pack?
and (3d or (3 (w) d) or (three (w) dimension?))
FILE 'USPAT' ENTERED AT 14:38:50 ON 10 SEP 1999
 U.S. PATENT TEXT FILE
   THE WEEKLY PATENT TEXT AND IMAGE DATA IS CURRENT
   THROUGH September 07, 1999.
FILE 'EPO' ENTERED AT 14:38:50 ON 10 SEP 1999
                    GPI
     EUROPEAN PATENT ABSTRACTS
     FILE 'JPO' ENTERED AT 14:38:50 ON 10 SEP 1999
                     G P I
      JAPANESE PATENT ABSTRACTS
      THE FILE IS CURRENT THROUGH APRIL 31, 1999.
 FILE 'USPAT'
      740746 STOR?
      598171 REPLACE?
       9869 OPERAND?
     1485671 HIGH
     1165499 LOW
     1465837 ORDER
       11030 LEFTMOST
       8712 RIGHTMOST
        444 (STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) OR
DER
           ) OR LEFTMOST OR RIGHTMOST)
      132117 FLOAT?
      127762 INTEGER?
      365390 PACK?
      40644 3D
     2478082 3
```

```
1016188 D
         24340 3 (W) D
       1073871 THREE
        645910 DIMENSION?
         70848 THREE (W) DIMENSION?
            12 ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) O
L1
RDE
               R) OR LEFTMOST OR RIGHTMOST)) AND FLOAT? AND INTEGER? AND P
ACK
               ? AND (3D OR (3 (W) D) OR (THREE (W) DIMENSION?))
FILE 'EPO'
        177494 STOR?
         39756 REPLACE?
          1372 OPERAND?
        269529 HIGH
        156319 LOW
        169182 ORDER
            54 LEFTMOST
            46 RIGHTMOST
            11 (STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) OR
DER
               ) OR LEFTMOST OR RIGHTMOST)
         28211 FLOAT?
         18169 INTEGER?
         72018 PACK?
          1244 3D
        345452 3
         63218 D
           835 3 (W) D
         92622 THREE
         67122 DIMENSION?
         12061 THREE (W) DIMENSION?
L2
             0 ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) O
RDE
               R) OR LEFTMOST OR RIGHTMOST)) AND FLOAT? AND INTEGER? AND P
ACK
               ? AND (3D OR (3 (W) D) OR (THREE (W) DIMENSION?))
FILE 'JPO'
        536459 STOR?
         43950 REPLACE?
          2418 OPERAND?
       1040677 HIGH
        460447 LOW
        219262 ORDER
           334 LEFTMOST
           223 RIGHTMOST
            21 (STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) OR
DER
               ) OR LEFTMOST OR RIGHTMOST)
         54707 FLOAT?
         30146 INTEGER?
        121574 PACK?
          9884 3D
       1748588 3
        243633 D
           530 3 (W) D
        138393 THREE
         98899 DIMENSION?
```

```
24036 THREE (W) DIMENSION?
             O ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) O
L3
RDE
               R) OR LEFTMOST OR RIGHTMOST)) AND FLOAT? AND INTEGER? AND P
ACK
               ? AND (3D OR (3 (W) D) OR (THREE (W) DIMENSION?))
TOTAL FOR ALL FILES
            12 ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W) O
L4
RDE
               R) OR LEFTMOST OR RIGHTMOST)) AND FLOAT? AND INTEGER? AND P
ACK
               ? AND (3D OR (3 (W) D) OR (THREE (W) DIMENSION?))
=> d 11 1-12 pno
1.
        5,936,872
                        [IMAGE AVAILABLE]
        5,680,568
                        [IMAGE AVAILABLE]
2.
        5,113,523
                        [IMAGE AVAILABLE]
3.
        4,785,393
                        [IMAGE AVAILABLE]
4.
        4,595,911
                        [IMAGE AVAILABLE]
5.
        4,525,780
                        [IMAGE AVAILABLE]
6.
7.
        4,495,563
                        [IMAGE AVAILABLE]
8.
        4,493,027
                        [IMAGE AVAILABLE]
        4,471,426
                        [IMAGE AVAILABLE]
9.
        4,455,602
                        [IMAGE AVAILABLE]
10.
        4,325,120
11.
                        [IMAGE AVAILABLE]
12.
        3,626,427
                        [IMAGE AVAILABLE]
=> d l1 1 ccls in hit
```

US PAT NO: 5,936,872 [IMAGE AVAILABLE]

L1: 1 of 12

US-CL-CURRENT: 708/622; 712/221

INVENTOR:

Stephen A. Fischer, Rancho Cordova, CA Larry M. Mennemeier, Boulder Creek, CA Alexander D. Peleg, Carmelia, Israel

Carole Dulong, Saratoga, CA Eiichi Kowashi, Ibaraki, Japan

ABSTRACT:

The invention provides a method and apparatus for storing complex data in formats which allow efficient complex multiplication operations to be performed and for performing such complex multiplication operations. According to one aspect of the invention, a method for multiplying complex numbers is provided for use in a data processing system. In response to receiving an instruction, eight data elements are read and used to generate a resulting complex number. These eight data elements were previously stored as packed data and include two representations of each of the components of a first and second complex number. Each of these representations is signed such that it represents either the positive or negative of said component. As a result of the manner in which these eight data elements are stored, the resulting complex number represents the product of the first and second complex numbers. According to another aspect of the invention, a machine-readable medium is described. This machine-readable medium has stored thereon data representing sequences of instructions which, when executed by a processor, cause that processor to perform the above described method.

SUMMARY:

the K register positions 0 to 63 and the M register positions 0 to 63. The product may have one leading zero digit thus being unnormalized because the multiplicand was digit normalized but not bit normalized and the last nonzero multiplier group may have had leading zero bits. The shift counter may or may not be equal to zero. If it is not zero, it contains a value equal to the number of leading zero digits that were in the multiplier fraction since it was originally set to a value equal to the total number of multiplier digits. The Put-Away 1 trigger is set and K register positions 0 to 55 (product fraction) and the exponent register (product exponent) are put into the floating point register. However, the product is not valid if the product fraction is unnormalized or the shift counter is not equal to zero. If the fraction is unnormalized, M register positions 0 to 55 are gated to the T/C input of the main adder, the L4 shift is selected, and the AOB is gated to both the K register positions 0 to 63 and the M register positions 0 to 63. The shift counter is gated to the T/C input of the exponent adder and the exponent register (product exponent) is gated to the other input. The T/C input is selected complement and the AE hot one trigger is set so that the shift counter is subtracted from the exponent register. The AEOB position 1 is complemented because exponents and floating point multiply shift counter values are excess 64 numbers and the result is put into the exponent register. The AE hot one trigger is not set if the product fraction is unnormalized. This reduces the product exponent by the shift counter value plus one. The shift counter is set to zero with the next A sample. The Put-Away 1 trigger is set again with the same sample along with the ELC trigger and the product fraction and exponent are put into the floating point register.

=> d hist

```
(FILE 'USPAT' ENTERED AT 14:24:19 ON 10 SEP 1999)
      FILE 'USPAT, EPO, JPO' ENTERED AT 14:38:50 ON 10 SEP 1999
      FILE 'USPAT'
              12 S ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W
 L1
.) 0
      FILE 'EPO'
               O S ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W
 L2
 ) 0
      FILE 'JPO'
               0 S ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W
 L3
 ) 0
      TOTAL FOR ALL FILES
              12 S ((STOR? OR REPLACE?) (P) OPERAND? (P) (((HIGH OR LOW) (W
 L4
 ) 0
 => s ((stor? or replace?) (p) operand?) and float? and integer? and pack? and
 (3d or (3 (w) d) or (three (w) dimension?))
 FILE 'USPAT'
         740746 STOR?
         598171 REPLACE?
           9869 OPERAND?
           6286 (STOR? OR REPLACE?) (P) OPERAND?
 <---->
```

```
SEARCH ENDED BY USER
FILE 'EPO'
SEARCH ENDED BY USER
=> s ((stor? or replace?) (p) operand?) and float? and integer? and pack? and
(3d or (3 (w) d) or (three (w) dimension?))
<----> User Break---->
u
SEARCH ENDED BY USER
=> s ((stor? or replace? or overlay? or overlai?) (p) operand?) and float?
and integer? and pack? and (3d or (3 (w) d) or (three (w) dimension?))
FILE 'USPAT'
        740746 STOR?
        598171 REPLACE?
         42820 OVERLAY?
         18486 OVERLAI?
          9869 OPERAND?
          6292 (STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?
        132117 FLOAT?
        127762 INTEGER?
        365390 PACK?
         40644 3D
       2478082 3
       1016188 D
         24340 3 (W) D
       1073871 THREE
        645910 DIMENSION?
         70848 THREE (W) DIMENSION?
           222 ((STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?)
L5
AND
                FLOAT? AND INTEGER? AND PACK? AND (3D OR (3 (W) D) OR (THR
EΕ
               (W) DIMENSION?))
FILE 'EPO'
        177494 STOR?
         39756 REPLACE?
          4260 OVERLAY?
          1440 OVERLAI?
          1372 OPERAND?
           600 (STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?
         28211 FLOAT?
         18169 INTEGER?
         72018 PACK?
          1244 3D
        345452 3
         63218 D
           835 3 (W) D
         92622 THREE
         67122 DIMENSION?
         12061 THREE (W) DIMENSION?
             O ((STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?)
L6
AND
                FLOAT? AND INTEGER? AND PACK? AND (3D OR (3 (W) D) OR (THR
EE
```

```
(W) DIMENSION?))
FILE 'JPO'
       536459 STOR?
        43950 REPLACE?
          2360 OVERLAY?
          1902 OVERLAI?
          2418 OPERAND?
          1192 (STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?
         54707 FLOAT?
        30146 INTEGER?
        121574 PACK?
          9884 3D
       1748588 3
       243633 D
           530 3 (W) D
        138393 THREE
         98899 DIMENSION?
        24036 THREE (W) DIMENSION?
             O ((STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?)
L7
AND
                FLOAT? AND INTEGER? AND PACK? AND (3D OR (3 (W) D) OR (THR
EΕ
               (W) DIMENSION?))
TOTAL FOR ALL FILES
           222 ((STOR? OR REPLACE? OR OVERLAY? OR OVERLAI?) (P) OPERAND?)
r_8
AND
                FLOAT? AND INTEGER? AND PACK? AND (3D OR (3 (W) D) OR (THR
ΕE
               (W) DIMENSION?))
=> logoff y
U.S. Patent & Trademark Office LOGOFF AT 15:53:13 ON 10 SEP 1999
```

```
U.S. PATENT TEXT FILE
    THE WEEKLY PATENT TEXT AND IMAGE DATA IS CURRENT
    THROUGH September 07, 1999.
=> file uspat epo jpo
FILE 'USPAT' ENTERED AT 11:04:09 ON 10 SEP 1999
          U.S. PATENT TEXT FILE
    THE WEEKLY PATENT TEXT AND IMAGE DATA IS CURRENT
   THROUGH September 07, 1999.
FILE 'EPO' ENTERED AT 11:04:09 ON 10 SEP 1999
                        G P I
       EUROPEAN PATENT ABSTRACTS
      FILE 'JPO' ENTERED AT 11:04:09 ON 10 SEP 1999
                        G P I
       JAPANESE PATENT ABSTRACTS
       THE FILE IS CURRENT THROUGH APRIL 31, 1999.
  => s ((mov? or transfer?) (p) (64 (w) bit?) (p) (storage or memory) (p) (128 (w) bit?) (p) register? (p) ((high? or low?) (w) order (w) bit?)) and float?
and integer? and pack? and (3d or (three (w) dimension?))
FILE 'USPAT'
      1247688 MOV?
       617118 TRANSFER?
       660243 64
       233638 BIT?
       442434 STORAGE
       264507 MEMORY
       234148 128
       233638 BIT?
       216994 REGISTER?
TERM 'LOW?' EXCEEDED TRUNCATION LIMITS - SEARCH ENDED
COMMAND INTERRUPTED
=> s ((mov? or transfer?) (p) (64 (w) bit?) (p) (storage or memory) (p) (128 (w) bit?) (p) register? (p) ((((high or low) (w) order) or leftmost or
rightmost) (w) bit?)) and float? and integer? and pack? and (3d or (three (w)
dimension?))
```

```
FILE 'USPAT'
<---->
SEARCH ENDED BY USER
=> s ((mov? or transfer?) (p) (64 (w) bit?) (p) (storage or memory) (p) (128
(w) bit?) (p) register? (p) ((((high or low) (w) order) or leftmost or
rightmost) (3w) bit?)) and float? and integer? and pack? and (3d or (three
(w) dimension?))
FILE 'USPAT'
       1247688 MOV?
        617118 TRANSFER?
        660243 64
        233638 BIT?
        442434 STORAGE
        264507 MEMORY
        234148 128
        233638 BIT?
        216994 REGISTER?
       1485671 HIGH
       1165499 LOW
       1465837 ORDER
         11030 LEFTMOST
          8712 RIGHTMOST
        233638 BIT?
             0 (MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMOR
Y)
               (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W) O
RDE
               R) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)
        132117 FLOAT?
        127762 INTEGER?
        365390 PACK?
         40644 3D
       1073871 THREE
        645910 DIMENSION?
         70848 THREE (W) DIMENSION?
             O ((MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMO
L1
RY)
                (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W)
ORD
               ER) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)) AND FLOAT? AND IN
TEG
               ER? AND PACK? AND (3D OR (THREE (W) DIMENSION?))
FILE 'EPO'
        433072 MOV?
        104712 TRANSFER?
         10796 64
         40427 BIT?
         86427 STORAGE
         73122 MEMORY
          1985 128
         40427 BIT?
         27065 REGISTER?
        269529 HIGH
        156319 LOW
        169182 ORDER
```

```
54 LEFTMOST
            46 RIGHTMOST
         40427 BIT?
             0 (MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMOR
Y)
               (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W) O
RDE
               R) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)
         28211 FLOAT?
         18169 INTEGER?
         72018 PACK?
          1244 3D
         92622 THREE
         67122 DIMENSION?
         12061 THREE (W) DIMENSION?
             0 ((MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMO
L2
RY)
                (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W)
ORD
               ER) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)) AND FLOAT? AND IN
TEG
               ER? AND PACK? AND (3D OR (THREE (W) DIMENSION?))
FILE 'JPO'
        537036 MOV?
        280043 TRANSFER?
         21235 64
         95990 BIT?
        228050 STORAGE
        277439 MEMORY
          2665 128
         95990 BIT?
        112068 REGISTER?
       1040677 HIGH
        460447 LOW
        219262 ORDER
           334 LEFTMOST
           223 RIGHTMOST
         95990 BIT?
             0 (MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMOR
Y)
                (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W) O
RDE
                R) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)
         54707 FLOAT?
         30146 INTEGER?
         121574 PACK?
           9884 3D
         138393 THREE
         98899 DIMENSION?
          24036 THREE (W) DIMENSION?
              0 ((MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMO
L3
RY)
                 (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W)
ORD
                ER) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)) AND FLOAT? AND IN
TEG
                ER? AND PACK? AND (3D OR (THREE (W) DIMENSION?))
```

TOTAL FOR ALL FILES

```
O ((MOV? OR TRANSFER?) (P) (64 (W) BIT?) (P) (STORAGE OR MEMO
L4
RY)
                (P) (128 (W) BIT?) (P) REGISTER? (P) ((((HIGH OR LOW) (W)
ORD
               ER) OR LEFTMOST OR RIGHTMOST) (3W) BIT?)) AND FLOAT? AND IN
TEG
               ER? AND PACK? AND (3D OR (THREE (W) DIMENSION?))
=> s ((mov? or transfer?) (p) (storage or memory) (p) register? (p) ((((high
or low) (w) order) or leftmost or rightmost) (3w) bit?)) and float? and
integer? and pack? and (3d or (three (w) dimension?))
FILE 'USPAT'
       1247688 MOV?
        617118 TRANSFER?
        442434 STORAGE
        264507 MEMORY
        216994 REGISTER?
       1485671 HIGH
       1165499 LOW
       1465837 ORDER
         11030 LEFTMOST
          8712 RIGHTMOST
        233638 BIT?
           464 (MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER? (
P)
               ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
BIT
               ?)
        132117 FLOAT?
        127762 INTEGER?
        365390 PACK?
         40644 3D
       1073871 THREE
        645910 DIMENSION?
         70848 THREE (W) DIMENSION?
            10 ((MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER?
L5
(P)
                ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
 ΒI
               T?)) AND FLOAT? AND INTEGER? AND PACK? AND (3D OR (THREE (W
) D
               IMENSION?))
FILE 'EPO'
        433072 MOV?
        104712 TRANSFER?
         86427 STORAGE
         73122 MEMORY
         27065 REGISTER?
        269529 HIGH
        156319 LOW
        169182 ORDER
            54 LEFTMOST
            46 RIGHTMOST
         40427 BIT?
             4 (MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER? (
P)
               ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
BIT
```

```
?)
         28211 FLOAT?
         18169 INTEGER?
         72018 PACK?
          1244 3D
         92622 THREE
         67122 DIMENSION?
         12061 THREE (W) DIMENSION?
L6
             0 ((MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER?
(P)
                ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
 ΒI
               T?)) AND FLOAT? AND INTEGER? AND PACK? AND (3D OR (THREE (W
) D
               IMENSION?))
FILE 'JPO'
        537036 MOV?
        280043 TRANSFER?
        228050 STORAGE
        277439 MEMORY
        112068 REGISTER?
       1040677 HIGH
        460447 LOW
        219262 ORDER
           334 LEFTMOST
           223 RIGHTMOST
         95990 BIT?
            40 (MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER? (
P)
               ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
BIT
               ?)
         54707 FLOAT?
         30146 INTEGER?
        121574 PACK?
          9884 3D
        138393 THREE
         98899 DIMENSION?
         24036 THREE (W) DIMENSION?
L7
             0 ((MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER?
(P)
                ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
BI
               T?)) AND FLOAT? AND INTEGER? AND PACK? AND (3D OR (THREE (W
) D
               IMENSION?))
TOTAL FOR ALL FILES
           10 ((MOV? OR TRANSFER?) (P) (STORAGE OR MEMORY) (P) REGISTER?
L8
(P)
                ((((HIGH OR LOW) (W) ORDER) OR LEFTMOST OR RIGHTMOST) (3W)
ΒI
               T?)) AND FLOAT? AND INTEGER? AND PACK? AND (3D OR (THREE (W
) D
               IMENSION?))
```

=> d 15 1-10 fd